



## The Evolution and Development of Endocrine Surgery

Malcolm H Wheeler\*

Department of Endocrine Surgery, University Hospital of Wales, UK

### Editorial

The evolution of endocrine surgery is a fascinating journey extending over hundreds of years.

This process can be divided into 3 phases:-

- i) Surgery of the endocrine glands formed part of surgery in general.
- ii) After the emergence of endocrinology as a science in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries surgeons fully appreciated that they were operating on endocrine glands.
- iii) The 3<sup>rd</sup> phase started in the 1950's. Specialized surgeons began to view endocrine surgery as a whole instead of concentrating on separate glands.

In each of these 3 phases there have been many key early milestones.

E.g. In phase 1 the first credible description of goiter surgery was provided by Roger Frugardi of Salerno in 1170, the year of the murder of Thomas Becket.

At the time of the French revolution in 1791 Pierre-Joseph Desault of Paris described a successful thyroidectomy.

In phase 2 the importance of the internal secretions of ductless glands was established by clinical observations especially those of Thomas Addison, Guys Hospital Physician, London on patients who had suffered undergone destruction of the adrenal glands.

Edouard Laguesse of Lille had proposed the term 'endocrine' in 1893. After Bayliss and Starling's remarkable discovery of 'secretin' in 1902, Starling proposed the name 'hormone' for this chemical messenger. Many endocrine diseases were initially recognized because of deficiency of hormone but as we move into phase 3 more and more endocrine syndromes due to hormone excess were being identified. Endocrine surgery now rapidly developed not only for tumors and hyperplasia but also for diseases caused by excessive hormone secretion.

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#### \*Correspondence:

Malcolm H Wheeler, Department of Endocrine Surgery, University Hospital of Wales, Aldbourne House 1, Cottrell Drive, Bonvilston, Vale of Glamorgan, Wales, UK, Tel: 0044 (0)1446 781126; E-mail: m.h.wheeler@btinternet.com

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As in many branches of surgery, advances in general anesthesia, antisepsis and hemostasis, the latter resulting primarily from surgical instrument technology, facilitated not just the development of endocrine surgery but also permitted the treatment of more complex and dangerous disorders such as pheochromocytoma and insulinoma.

Yet these steps alone were not sufficient to provide endocrine surgery with the necessary stimulation and scientific basis for it to achieve its full and true potential. This required first and foremost an ever increasing knowledge of the physiology of the endocrine system and its many players with an understanding of the complexities of derangement and pathophysiology. This was initially a slow process but required close cooperation between clinicians and basic scientists. Identification and isolation of the individual hormones produced by the endocrine glands would follow making hormone replacement after surgery a reality. Excellent examples of this process were seen at the Mayo Clinic with the discovery of thyroxine by Kendall in 1914 and later cortisol by the same investigator. As more and more surgery of the endocrine glands was being performed it became increasingly clear that endocrine surgery as a developing discipline required not only excellent surgical technique but also a firm scientific foundation. Hormone assays and later radioimmunoassay, developed by Yalow and Berson, initiated an era of precise evaluation of hormonal abnormality. Yalow was awarded the Nobel Prize for Medicine in 1977, only the 2<sup>nd</sup> woman to win it.

Advances in radiological techniques, especially cross-sectional imaging with CT and MRI, and the use of radioisotopes were pivotal to the accurate localization of endocrine tumors. Biochemical and histopathological discoveries such as Pearce's APUD concept all underlined the scientific basis of the specialty. Today molecular biology and genetics are playing an increasingly important role

in the promotion of our understanding of endocrine disease and the selection of appropriate surgical intervention. Further impetus has recently derived from the remarkable explosion of endoscopic and minimally invasive surgical techniques. The latter approach has been further refined and advanced by the advent and clinical application of augmented and virtual reality. Minimally invasive surgery has been particularly valuable with regard to the adrenal glands rendering adrenalectomy a much safer procedure with fewer postoperative complications and much shortened hospital stay. There is no doubt that in spite of a somewhat protracted and tortuous initial development, endocrine surgery has now come of age with its recognition and acceptance as a true surgical specialty in its own right. It is difficult to determine at which point exactly this event occurred but it is probably between the 1960's and 70's when surgeons finally regarded the endocrine system as a whole, appreciated the need to work closely with other disciplines, (endocrinologists, biochemists, radiologists, pathologists, nuclear medicine specialists, basic scientists, etc.) and also began to publish books and journals devoted to the subject. Very soon National and International Associations were formed and enthusiastically supported. Postgraduate courses in endocrine surgery started to appear with the realization that it was absolutely essential to organize and structure training if the very best young trainees were to be attracted into the specialty.

In summary, endocrine surgery has evolved into an exciting and challenging specialty which demands not only surgical excellence but also a sound understanding and application of scientific principles and an ever increasing interaction with a wide range of medical disciplines.

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